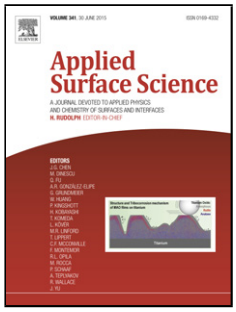

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PII: S0169-4332(17)30872-3
DOI: http://dx.doi.org/doi:10.1016/j.apsusc.2017.03.191
Reference: APSUSC 35567

To appear in: *APSUSC*

Received date: 3-2-2017
Revised date: 12-3-2017
Accepted date: 20-3-2017

Please cite this article as: Yaping Wang, Jin Lou, Lilan Zeng, Junhuai Xiang, Shufang Zhang, Jun Wang, Fucheng Xiong, Chenglin Li, Ying Zhao, Rongfa Zhang, Osteogenic Potential of a Novel Microarc Oxidized Coating Formed on Ti6Al4V Alloys, Applied Surface Sciencehttp://dx.doi.org/10.1016/j.apsusc.2017.03.191

Osteogenic Potential of a Novel Microarc Oxidized Coating Formed on Ti6Al4V Alloys

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Research Highlights

- Phytic acid is used as the MAO electrolyte of titanium alloys.
- MAO coatings are composed of rutile, anatase, TiP_2O_7 and some OH^- groups.
- The MAO samples present excellent in vitro cytocompatibility.

Abstract:
In order to improve the biocompatibility, Ti6Al4V alloys are processed by micro arc oxidation (MAO) in a novel electrolyte of phytic acid, a natural organic phosphorus-containing matter. The MAO coatings were characterized by scanning electron microscopy (SEM), energy dispersive X-ray spectroscopy (EDS), X-ray diffraction (XRD), Fourier Transform Infrared (FT-IR) and X-ray photoelectron spectroscopy (XPS). The cytocompatibility of Ti6A14V alloys before and after MAO were comprehensively evaluated. The results showed that the fabricated MAO coatings were composed of rutile, anatase, TiP_2O_7 as well as some OH^- groups, exhibiting the excellent hydrophilicity and a porous structure with small micro pores. No cytotoxicity towards MC3T3-E1cells was observed in this study. In particular, MAO treated Ti6Al4V alloys presented comparable cell adhesion and proliferation as well as significantly enhanced alkaline phosphatase activity, extracellular matrix (ECM) mineralization and collagen secretion in comparison with the untreated control. The results suggest that the Ti6Al4V alloys treated by MAO in phytic

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